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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Andrew Bruss

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EXAMINER

SMITH, JEFFREY S

ART UNIT

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2624

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/679,250	<b>Applicant(s)</b> BRUSS ET AL.	
	<b>Examiner</b> Jeffrey S. Smith	<b>Art Unit</b> 2624	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 June 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's other arguments filed June 6, 2007 have been fully considered but they are not persuasive.

Applicant argues that "rather than maintaining a first set and a second set of values, Kaufman discloses mapping values using transfer functions. The mapping functions appear to be executed when the image is rendered, there is no teaching or disclosure of having two sets of values maintained and available when the image is rendered." However, applicant appears to be doing exactly the same thing. None of applicant's figures actually show "having two sets of values maintained and available when the image is rendered." The claim itself does not recite "having two sets of values maintained and available when the image is rendered." The specification on page 8 says that "In some embodiments, first and second color tables are separate color tables in separate memory sections. In alternative embodiments, first and second color tables are separate sections of a single color table maintained by a graphics subsystem. In further alternative embodiments, first and second color tables comprise values loaded into a single color table at separate points in the execution of the method. For example, first color table 212 may be loaded while rendering non-segmented vessel data and second color table 214 may be loaded while rendering segmented blood-vessel data." Thus it appears from applicant's limited disclosure of this claim element that the color tables (values for rendering characteristics) are maintained by loading them during rendering. To the extent that storing the values in memory is the claimed "maintaining,"

paragraphs 120 and 121 of Kaufman state that the voxel data (values for rendering characteristics) can be either stored in memory or generated when rendering.

Applicant argues that “nowhere in the cited statements or in Hall as a whole is it disclosed that a first and second set of values for a rendering characteristic may be maintained and used to render segmented and non-segmented data to emulate an angiogram as recited in claims 1, 18, 29 and 40.” However, “emulate an angiogram” is not in the body of claim 1 but rather in the preamble and therefore has no patentable weight. Hall does disclose values for rendering characteristics that are used to render segmented and non-segmented data as shown for example in figures 2, 4, 6 and 8, which are blood vessels that are rendered against a background by using sets of values for rendering characteristics of the blood vessels and the background. To the extent that applicant’s main point of this argument is the word “maintaining,” this argument is unpersuasive for the reasons given in the immediately preceding paragraph.

Applicant argues that “The color tables 104 of Saito are not directly used for ‘rendering the non-segmented data using the first set of values for the rendering characteristic and rendering the segmented blood vessel data using the second set of values for the rendering characteristic.’ Rather, the values from the color tables are mapped onto parameter sets for various objects. These parameter sets and not the color tables 104 are used to display objects.” Again, applicant appears to be doing exactly this. The claim does not recite “color tables are directly used for rendering ....” Even so, adding color values from color values to the parameter set used for rendering objects appears to be exactly the same as rendering non-segmented and blood vessel

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data using color tables. Applicant is not claiming that the only values needed for rendering the blood vessel data are the color values from the color table. To the extent that other values are needed, such as opacity (or transparency) values as shown in Saito's figure 3, these values form a parameter set that is used for rendering the blood vessel, which is what applicant is doing. See for example applicant's figure 3 and also his claims 8-11.

Applicant argues that "The Office Action does not specify any section of Saito where it is taught or suggested that an inverted color may be used in a second color table." Figure 1 of Saito shows images that are displayed in black against a background that is white, which is the inverse of black. Similarly, figures 18A-19C of Kaufman show the same. Furthermore, this inverse color representation is how the 2D images from the scanning of Saito and Kaufman are represented.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 18, 29 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Application Publication No. 2001/0031920 published Oct. 28, 2001 by Kaufman et al. ("Kaufman").

For claim 1, Kaufman discloses loading three-dimensional image data representing at least a portion of a body (see step 104 of Figure 1), segmenting at least a portion of the blood vessel data from the three-dimensional data to create segmented blood vessel data and non-segmented data (see paragraph 221), maintaining values for a rendering characteristic, and rendering the non-segmented data and the blood vessel data using the values of the rendering characteristic (see paragraph 221, which states that "the techniques discussed regarding virtual biopsy can be applied in this context to evaluate vessel wall." See paragraphs 173-174 "The above described techniques can also form the basis of a system for performing virtual electronic biopsy.... As noted above, volume rendering techniques use one or more defined transfer functions to map different ranges of sample values of the original volume data to different colors, opacities and other displayable parameters").

Claims 18, 29 and 40, which contain similar limitations, are also rejected for these reasons.

Claims 1, 16-18, 29, 40 and 55-56 are rejected under 35 U.S.C. 102(b) as being anticipated by "A complete simulation of x-ray angiography" by Peter Hall ("Hall") and cited in the Information Disclosure Statement.

For claims 1, 18, 29 and 40, Hall discloses loading 3-D image data, segmenting the data, and rendering blood vessels (see page 1064, "the reconstruction algorithm is premised on an ability to automatically segment places where vessels appear to branch

or cross...." See also page 1065 "Ray-tracing may be used to render voxel data sets....  
Our rendering method can be generalized to cope with general CSG models.")

For claims 16-17 and 55-56, Hall provides an animated view of the blood vessel and non-segmented data (see pages 1068-1074, "Simulating blood flow and animation control").

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-13, 19-28, 30-39, and 41-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman in view of U.S. Patent Number 6,826,297 issued to Saito et al. ("Saito").

For claim 2, Kaufman discloses the elements of parent claim 1. For claim 2, Kaufman discloses a rendering characteristic that is color (see paragraph 173 "four independent transfer functions have been used to determine different material by mapping ranges of CT density values into specified colors of red, green, blue and opacity, each in the range of 0 to 255").

Kaufman does not explicitly disclose first and second color tables.

Saito in Figure 3 discloses first and second color tables 104.

It would have been obvious to one of ordinary skill in the art at the time of invention to provide the user settable color tables of Saito with the three dimensional angiograph of Kaufman to apply predefined object parameter sets to the voxel values of the three dimensional voxel data, thus eliminating the complicated and troublesome parameter setting process and more accurately reproducing the three dimensional image, as taught by Saito at column 3 lines 1-5.

For claim 3, Saito discloses a device to display medical images that allows a user to select the color used by the color table (See Figure 2, "color setting"). The color is included in a color table (See Figure 3 elements 104). The user can select any color using the device of Saito. Absent any critical showing of the advantages of white over any other color, choosing the color in the color table 104 to be white is obvious.

For claim 4, the color in the color table of Saito can be black.

For claims 5 and 6, both Saito (Figure 3) and Kaufman (paragraph 173) have a plurality of colors.

For claim 7, the user in Saito can select one color for one object, and the inverted color for the background object as shown in figure 1.

For claims 8-11, Saito in Figure 2 allows the user to select the amount of transparency. Absent any critical showing of choosing a transparency value to be a specific value, such as 80 percent, choosing these specific values using the device of Saito is obvious.

For claims 12-13, Saito allows a user to set a perspective view (See column 2 lines 38-40).



Claims 19-28, 30-39, and 41-52, which contain similar limitations, are rejected for these reasons.

Claims 14-15 and 53-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman in view of Saito as applied to claim above, and further in view of U.S. Patent Number 6,501,848 issued to Carroll et al. ("Carroll").

For claims 14-15, Kaufman and Saito disclose the elements of parent claims 1, 12 and 13.

Kaufman and Saito do not disclose an orthographic view of the right anterior oblique.

Carroll discloses an orthographic view of the right anterior oblique (see column 7 lines 1-10).

It would have been obvious to one of ordinary skill in the art at the time of invention to include the right anterior oblique view of Carroll with the displays of Kaufman and Saito, to minimize image point errors and vector point errors, as taught by Carroll at column 3 lines 42-52.

Claims 53-54, which recite similar limitations, are rejected for these reasons.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Smith whose telephone number is 571 270-1235. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSS  
July 12, 2007



JINGGE WU  
SUPERVISORY PATENT EXAMINER